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article on the growth of the horns of the prong buck, in the NATURALIST, volume ii., page 131, and find some differences between his observations and mine, from which we may infer the want of exact uniformity not only in the structure but in the progress of the growth of the horn. The section of the horn shown in Figure 12 shows a core differing in both form and extent from any I have seen. I have never met one where the core extended above the prong.

ARE POTATO BUGS POISONOUS?¹

BY AUG. R. GROTE AND ADOLPH KAYSER.

A STATEMENT of the poisoning qualities of the *Doryphora decemlineata*, or potato bug, has repeatedly been made in public prints, and notably in the Seventh Report on the Insects of Missouri by Professor C. V. Riley. It is claimed that after coming in contact with the bugs, or inhaling the steam or smoke produced by boiling or burning them, persons have exhibited various symptoms of cutaneous or nervous disease.

To investigate the matter, a quantity of the bugs collected from fields near Buffalo, where no arsenic had been used, was submitted to distillation with salt water, so as to allow of an increased temperature. Under this process, about four ounces of liquid were procured from one quart measure of the insects. This liquid was perfectly clear, and emitted a highly offensive smell; it proved of alkaline reaction on account of the presence of a certain quantity of free ammonia and carbonate of ammonia.

Again, an equal quantity of the bugs was used to prepare a tincture made as follows: Absolute and chemically pure alcohol was condensed upon the live bugs; after a digestion of twenty-four hours the alcohol was evaporated at a gentle heat. The tincture so obtained had a decidedly acid reaction, was brown in color, and was not disagreeable in smell.

To ascertain the effect on the animal system of the liquid and the tincture above described, a number of frogs were procured for the experiment. About one half cubic centimetre of the liquid and the tincture each was introduced separately into the stomach. Neither the liquid nor the tincture produced any apparent effects. The vivacity of the frogs so treated continued unimpaired, notwithstanding the complete retention of the doses. Again, two

¹ Read at the Detroit Meeting of the American Association for the Advancement of Science, 1875.

fresh frogs were submitted to a hypodermic injection of the liquid and the tincture, in the hind legs, by means of an ordinary hypodermic syringe. The injection of the distilled liquid was unattended by injurious results. A slight disinclination, at first, to use the hind limbs was shown also in the case of another frog, which was treated hypodermically with pure water to check the results obtained.

The injection of the tincture, however, proved fatal to the subject. A few moments after the injection the leg operated upon seemed to become paralyzed, and the heart stopped beating within thirty minutes afterwards, by which time the other two hypodermically treated seemed to have completely overcome the effects of the operation.

The tincture, although highly concentrated, contained but a small quantity of animal acids, which, when saturated with bases of potassa and soda, formed deliquescent hexagonal crystals, visible under the microscope, but insufficient in quantity to analyze. It is known that such acids are very active in their effects upon the animal system. The bite of a flea or of a bedbug is attended by an introduction of acids which produce a swelling by the coagulation of the albuminous fluids of the body. The rapid coagulation of milk was shown by the experiment of introducing a few drops of the tincture above described, during the present experiments. In the case of the insects above mentioned, especial organs are occupied with the secretion of the acids which serve the insect economy by coagulating those parts of the blood of the victim which may not be useful for food. No such organs have been noticed in the potato bug. The presence of the acid leads us to conjecture as to the origin of such organs, while they have apparently not become developed in the potato bug. The acids being found to be present in such small quantity, the conclusion is unavoidable, in the light of the present experiments, that the bugs are *not* poisonous.

Rather does it seem likely that the published statements to the contrary were based on erroneous observations, while it is extremely probable that certain of the more aggravated and circumstantially detailed cases of poisoning are due to the effects of arsenic (Paris green and arsenious acid), which is now profusely used for the extermination of the bugs. Many metallic salts will produce cutaneous irritation; when arsenic is sublimed by heat, the inhaled fumes will produce nervous disorder; the effects of Paris green may have been mistaken for those of the potato

bugs. It is credible, moreover, that when larger amounts of the bugs are thrown into a fire to destroy them, even when not containing any arsenic, an incomplete combustion might take place, in which case carbonous oxide (CO) would be produced, which would certainly bring about the evil effects complained of. It may also be remarked that previous to the advent of the potato bug the potato plant itself had not been so freely handled as lately; an inquiry as to the effects of the entrance of the minute hairs from the leaf into the skin, and also into the properties of the juice of the plant, might show cause for some symptoms complained of.

At this time, when the use of arsenious acid is forbidden in Germany in the manufacture of aniline colors, on account of its evil effects on animal organisms, it may not be thought improper to call the attention of the people of our country to the present use of arsenic in the culture of so universal a food plant as the potato.



THE LITTLE MISSOURI "BAD LANDS."

BY J. A. ALLEN.

IN Western Dakota are what are termed the Little Missouri "Bad Lands," a region as picturesque and strange as the imagination can well conceive. As we leave the Missouri River at Fort Abraham Lincoln, the present western terminus of the Northern Pacific Railroad, the journey to these "Bad Lands" is mainly by the so-called Sully's Trail, which runs nearly due westward between the 46th and 47th parallels. The three hundred miles of treeless prairies that lie between the Missouri and Little Missouri rivers present us with nothing of remarkable interest. Gradually, as we advance westward, the grass becomes scantier and the cacti and sage bushes more abundant, evincing the increasing aridity of the climate. Isolated, conical mounds or "buttes," occasionally of considerable height, are seen at long intervals, and serve as important landmarks. The streams are few and small, the most of them dwindling towards the end of summer to a series of detached, brackish pools. Along the larger of them we meet here and there with little clumps of trees, or, more rarely, with continuous narrow belts of timber, consisting mainly of box-elder and cotton-wood, with a sprinkling of elm; or occasionally they are made up almost entirely of oak. These little groves, sometimes a day's journey apart, constitute the